

Atty. Docket No. YOR20010010US1
(590.043)

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

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Listing of Claims:

1. (Currently Amended) An apparatus for compensating for interference in speech recognition, said apparatus comprising:

a first input ~~medium~~ device which obtains an initial speech signal, wherein said first input device is adapted to obtain the initial speech signal in an environment where noise corresponding to at least one interfering signal is present and said noise is not linearly time invariant coupled to said initial speech signal;

a second input ~~medium~~ device which obtains at least one interfering signal, wherein said at least one interfering signal is not statistically independent of said initial speech signal, and further wherein said second input device is adapted to obtain solely the at least one interfering signal;

a normalizing arrangement which reconciles the initial speech signal and at least one interfering signal with one another to produce a final speech signal, wherein said reconciliation can be done in real-time and further wherein the final speech signal is a clean speech signal;

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said normalizing arrangement being adapted to account for non-stationary noise in the at least one interfering signal, wherein said normalizing arrangement utilizes a multi-channel codeword-dependent cepstral normalization;

said normalizing arrangement being further adapted to:

estimate at least one characteristic of the at least one interference signal given at least one characteristic of the initial speech signal, wherein said estimating step comprises:

referring to a single codebook in estimating at least one characteristic of the at least one interference signal; and

apply a compensation term to the initial speech signal in reconciling the initial speech signal and the at least one interfering signal with one another, wherein said normalizing arrangement is adapted to estimate the compensation term via assessing its expectation value over a plurality of codewords in the codebook

~~wherein said reconciliation can be done in real-time; and~~

~~wherein said normalizing arrangement utilizes a multi-channel codeword-dependent cepstral normalization.~~

2. (Cancelled) The apparatus according to Claim 1, wherein said first input medium is adapted to obtain the initial speech signal in an environment where noise

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corresponding to the at least one interfering signal is present and said noise is not linearly time invariant coupled to said initial speech signal.

3. **(Cancelled)** The apparatus according to Claim 2, wherein said second input medium is adapted to obtain solely the at least one interfering signal.

4. **(Cancelled)** The apparatus according to Claim 1, wherein the final speech signal is a clean speech signal.

5. **(Cancelled)** The apparatus according to Claim 1, wherein said normalizing arrangement is adapted to estimate at least one characteristic of the at least one reference signal given at least one characteristic of the initial speech signal.

6. **(Cancelled)** The apparatus according to Claim 5, wherein said normalizing arrangement is further adapted to refer to a single codebook in estimating at least one characteristic of the at least one reference signal.

7. **(Cancelled)** The apparatus according to Claim 6, wherein said normalizing arrangement is adapted to apply a compensation term to the initial speech signal in reconciling the initial speech signal and at least one interfering signal with one another.

8. **(Cancelled)** The apparatus according to Claim 7, wherein said normalizing arrangement is adapted to estimate the compensation term via assessing its expectation value over a plurality of codewords in the codebook.

9. **(Currently Amended)** A method of compensating for interference in speech recognition, said method comprising the steps of:

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obtaining an initial speech signal, wherein said step of obtaining an initial speech signal comprises obtaining the initial speech signal in an environment where noise corresponding to at least one interfering signal is present and said noise is not linearly time invariant coupled to said initial speech signal;

obtaining at least one interfering signal, wherein said at least one interfering signal is not statistically independent of said initial speech signal, and further wherein said step of obtaining at least one interfering signal comprises obtaining solely the at least one interfering signal; and

reconciling the initial speech signal and at least one interfering signal with one another to produce a final speech signal, wherein said reconciliation can be done in real-time and further wherein the final speech signal is a clean speech signal;

said reconciling step further comprising the steps of:

accounting for non-stationary noise in the at least one interfering signal;

wherein said reconciling step further comprises utilizing a multi-channel codeword-dependent cepstral normalization;

estimating at least one characteristic of the at least one interference signal given at least one characteristic of the initial speech signal, wherein said estimating step comprises:

referring to a single codebook; and

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applying a compensation term to the initial speech signal, wherein said
reconciliation comprises estimating the compensation term via assessing its
expectation value over a plurality of codewords in the codebook

~~wherein said reconciliation can be done in real-time; and~~

~~wherein said normalizing arrangement utilizes a multi-channel codeword-
dependent cepstral normalization.~~

10. (Cancelled) The method according to Claim 9, wherein said step of obtaining an initial speech signal comprises obtaining the initial speech signal in an environment where noise corresponding to the at least one interfering signal is present and said noise is not linearly time invariant coupled to said initial speech signal.

11. (Cancelled) The method according to Claim 10, wherein said step of obtaining at least one interfering signal comprises obtaining solely the at least one interfering signal.

12. (Cancelled) The method according to Claim 9, wherein the final speech signal is a clean speech signal.

13. (Cancelled) The method according to Claim 9, wherein said reconciling step comprises the step of estimating at least one characteristic of the at least one reference signal given at least one characteristic of the initial speech signal.

14. (Cancelled) The method according to Claim 13, wherein said estimating step comprises referring to a single codebook.

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15. (Cancelled) The method according to Claim 14, wherein said reconciling step comprises the step of applying a compensation term to the initial speech signal.

16. (Cancelled) The method according to Claim 15, wherein said estimating step comprises estimating the compensation term via assessing its expectation value over a plurality of codewords in the codebook.

17. (Currently Amended) A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for compensating for interference in speech recognition, said method comprising the steps of:

obtaining an initial speech signal, wherein said step of obtaining an initial speech signal comprises obtaining the initial speech signal in an environment where noise corresponding to at least one interfering signal is present and said noise is not linearly time invariant coupled to said initial speech signal;

obtaining at least one interfering signal, wherein said at least one interfering signal is not statistically independent of said initial speech signal, and further wherein said step of obtaining at least one interfering signal comprises obtaining solely the at least one interfering signal; and

reconciling the initial speech signal and at least one interfering signal with one another to produce a final speech signal, wherein said reconciliation can be done in real-time and further wherein the final speech signal is a clean speech signal;

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said reconciling step further comprising the steps of:

accounting for non-stationary noise in the at least one interfering signal;

wherein said reconciling step further comprises utilizing a multi-channel
codeword-dependent cepstral normalization;

estimating at least one characteristic of the at least one interference signal
given at least one characteristic of the initial speech signal, wherein said
estimating step comprises:

referring to a single codebook; and

applying a compensation term to the initial speech signal, wherein said
reconciliation comprises estimating the compensation term via assessing its
expectation value over a plurality of codewords in the codebook

~~wherein said reconciliation can be done in real time; and~~

~~wherein said normalizing arrangement utilizes a multi-channel codeword-
dependent cepstral normalization.~~